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A SMOKE GENERATION APPARATUS
[Kun'en hassei soochi]

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Specification

1. Title of the invention

A smoke generation apparatus

2. Scope of patent claims

(Claim 1) A smoke generation apparatus that is characterized by the fact that it is constructed such that there is a transport duct to transport the smoke material that was sent from the injection part is connected to the injection part that is used for injection of the smoke material, such as wood scraps, there is an external air flow inhibition mechanism on said injection part such as an in-feed screw or rotor to prevent the easy inflow of air from the injection part into the transport duct, there is an agitation and transport mechanism in said transport duct such as an in-feed screw to transport the smoke material that was sent from the injection part while agitating this material, there is a heating part in this transport duct to control the temperature of and to heat the smoke material that is agitated and transported in the transport duct, and there is a collection part that not only connects the smoke discharge path to the end of the transport duct, but that will also collect any solid content or liquid content that

may fall from said transport duct end, resulting in the derivation and generation of smoke from said smoke discharge path.

(Claim 2) A smoke generation apparatus as noted in Claim 1 that is characterized by the fact that it is constructed such that there is a discharge path cleaning mechanism in said smoke discharge path to inject a water flow or a spray flow of water vapor or the like in the direction of said collection part, resulting in the derivation and generation of smoke from said smoke discharge path.

3. Detailed description of the invention

(0001)

(Field of industrial application) The present invention relates to a smoke generation apparatus to generate smoke in order to manufacture a smoked product through a smoking process.

(0002)

(Prior art and problem to be solved by the invention) The ultra-cold smoked product (Japanese Examined Patent Application Publication H07-42696) that was successfully achieved a result of development and research into improvements by the present applicant is a product that focuses on freshness, as manufactured using a processing

and treatment method that is not conventionally used in smoked products, and it is a product that was born based on this novel smoking process method.

(0003) These products are products that were developed for raw food (sashimi) while performed classification processing of the processed products, or that can form frozen foods for which handling of fresh fish has not been heretofore possible.

(0004) These smoked products can

① significantly improve the flavor and taste of the food.

(0005) In fresh fish products, the addition of food additives is generally not permitted, and there is no method available other than to proceed with differentiation based on the production environment, the feed, and on the handling of the product.

(0006) When forming a processed product, it is possible to freely adjust the flavor using additives within the permitted range of the Food Hygiene Law.

(0007) ② By performing color processing to improve the degree of stability, it is possible to prevent the formation of methomyoglobin from the myoglobin as a result of freeze or vacuum package processing.

(0008) ③ The range of inhibition of microorganisms is broadened, broadening the methods to treat deterioration of the product.

(0009) The present applicant simultaneously performed development into a specialized machine (smoke generation apparatus) as required in performing this smoking process with the afore-mentioned characteristics, resulting in the completion of the present invention.

(0010) The most important aim/topic of the present invention is ① to improve the fragrant components contained within the smoke, and to create a smoke smell that conjures up none of the images of conventional smoked products, but that imparts a light and refreshing impression. The fundamental principle is to remove the tar component from smoke in which the generation of oxides has been restricted as much as possible, and to create a favorable smoke quality.

(0011) ② A further aim of the present invention is to achieve coloration and stability of the pigments.

(0012) Under fixed conditions, it will be possible to generate smoke using a temperature range that is adequate for dry distillation (containing no oxygen).

(0013) ③ A further aim of the present invention is to ensure favorable efficacy in sterilization and bacteriostasis.

(0014) In addition to the sterilization efficacy of formaldehyde and phenol or the like as generated in the dry distillation state, by mixing cypress into the smoke material, it is possible to expect a further stabilized sterilization efficacy.

(0015) In order to achieve the above aims, it is necessary to perform accurate and uniform heating of the smoke material that rapidly reaches the target temperature band in a structure in which there is little introduction of outside air, and further, in addition to requiring a continuous structure to stabilize the gas components, it is desirable to have a structure with no risk of explosion, and for which maintenance management will be easy.

(0016) The smoke that is used in conventional smoking processes is generated as a result of a heat source by simply combusting chip material such as the cherry wood. Therefore, due to the method to perform combustion by taking in oxygen, it is not possible to avoid the inclusion of oxides in the smoke, resulting in a smoke odor that does not have the light and refreshing quality as described above, and preventing sufficient achievement of

stabilization of the color of the pigments in the food material and of the sterilization efficacy.

(0017) The present invention aims to provide a smoke generation apparatus to improve upon these points, and that can generate an exceedingly superior smoked product.

(0018)

(Means for solving the problem) We will explain the claims of the present invention while referring to the attached drawing.

(0019) The present invention relates to a smoke generation apparatus that is characterized by the fact that it is constructed such that there is a transport duct 3 to transport the smoke material 1 that is sent from the injection part 2 is connected to the injection part 2 that is used to inject the smoke material 1, such as wood scraps, there is an external air flow inhibition mechanism 4 on said injection part 2 such as an in-feed screw 4A or rotor to prevent the easy inflow of air from the injection part 2 into the transport duct 3, there is an agitation and transport mechanism 5 in said transport duct 3 such as an in-feed screw 5A to transport the smoke material 1 that was sent from the injection part 2 while agitating this material, there is a heating part 6 in this transport duct 3 to control the temperature of and to heat the smoke

material 1 that is agitated and transported in the transport duct 3, and there is a collection part 8 that not only connects the smoke discharge path 7 to the end of the transport duct 3, but that will also collect any solid content or liquid content that may fall from said transport duct 3 end, resulting in the derivation and generation of smoke from said smoke discharge path 7.

(0020) Further, the present invention relates to a smoke generation apparatus as noted in Claim 1 that is characterized by the fact that it is constructed such that there is a discharge path cleaning mechanism 9 in said smoke discharge path 7 to inject a water flow or a spray flow of water vapor or the like in the direction of said collection part 8, resulting in the derivation and generation of smoke from said smoke discharge path 7.

(0021)

(Operation) The smoke material 1 that is injected from the injection part 2 will be transported into the transport duct 3, while the external air flow inhibition mechanism 4 will ensure that external air is not easily carried in with the smoke material 1.

/3

(0022) Further, the smoke material 1 will be transported while being agitated by the agitation and transport

mechanism 5, and it will be uniformly heated to the specified temperature band by the heating part 6.

(0023) As the structure is such that it is difficult for external air to flow into this heating part 6, the smoke material 1 will be difficult to combust, and also as the smoke material 1 is heated while being agitated, it will be possible to heat the smoke material 1 uniformly to the specified temperature without requiring a heat source for combustion, resulting in thermal decomposition, and making it possible to obtain a large quantity of good smoke with few oxides.

(0024)

(Example of embodiment) The present example of embodiment is constructed such that there is an injection part 2 in which a hopper 2B was placed on the upper part of the hanging conduit 2A, there is an in-feed screw 4A that will be rotated by the motor 4B for use as the external air flow inhibition mechanism 4 within this hanging conduit 2A, and there is a transport duct 3 that is connected to the bottom part of this hanging conduit 2A.

(0025) Therefore, the smoke material 1 that is injected into the hopper 2B will be transported within the transport duct 3 by the in-feed screw 4A, but the structure is not one in which the material is simply dropped within the

hanging conduit 2A, and the structure is one in which it is difficult for external air to enter the transport duct 3 as a result of the transport of the material using the in-feed screw 4A.

(0026) Within this transport duct 3, there is an in-feed screw 5A that will be rotated by the motor 5B for use as the agitation and transport mechanism 5, and the structure is such that the smoke material 1 that was transported from the injection part 2 will be agitated by this in-feed screw 5A as it is transported to the lateral terminal side.

(0027) Also, in the present example of embodiment, there is a band heater within this transport duct 3 for use as the heating part 6, and this heater is constructed such that it will control the temperature.

(0028) Therefore, the method will be dry distillation in a sealed structure air from the injection part 2 will not enter, and the transported smoke material 1 will be heated by multiple band heaters for which the temperature was controlled at each stage within the appropriate temperature band, resulting in the generation of good quality smoke that has been dry-distilled, and that contains few oxides due to a lack of combustion.

(0029) Further, while the method is one of dry distillation, due to the fact that the smoke material 1 that is

transported along the bottom of the transport duct 3 will be transported and heated while being agitated by the in-feed screw 5A, the smoke material 1 will be uniformly heated to the appropriate temperature without a heat source from combustion, making it possible to continuously generate a large quantity of good quality smoke as a result of thermal decomposition.

(0030) A smoke discharge path 7 is connected to the end of this transport duct 3 in a mostly hermetically sealed state such that external air will not enter the heating part 6, and at the bottom part below this, there is a collection part 8 to collect any liquid content (tar content) and solid content (charcoal) that will fall from the end of the transport duct 3. In the present example of embodiment, the structure is such that a water tank is used as this collection part 8, and the overflow discharge fluid from this water tank will be passed through a separation strainer plate 10 (a punched metal plate) such that the powder waste material 14 (mainly carbon) will be collected in the waste tank 11 and the water content will be collected in the storage tank 12.

(0031) Also, there is an exhaust air duct part 7A on the upper part of said smoke discharge path 7, there is an exhaust air duct part 7B that branches off of this exhaust

air duct part 7A to lead to the lower collection tank 13, and the structure is such that the smoke that is generated within the transport duct 3 will be discharged externally via the exhaust air duct part 7A and the exhaust air duct part 7B of the smoke discharge path 7.

(0032) The present example of embodiment has a structure in which there is a discharge path cleaning mechanism 9 to inject cleaning water in the direction of the collection part 8 and collection tank 13 in the exhaust air duct part 7A and exhaust air duct part 7B of the smoke discharge path 7, and with constant cleaning to prevent clogging resulting from the adhesion of tar components or charcoal within the exhaust air duct part 7A and exhaust air duct part 7B, it is possible to discharge good quality smoke.

(0033)

(Effect of the invention) The present invention has the above-described structure, so the structure is one in which it is difficult for external air from the injection part to enter, and in which the path from the injection area to the smoke discharge area is mostly hermetically sealed, so it is possible to heat the material to the specified temperature without combusting the smoke material. Further, it is possible to resolve the problems of a failure to achieve uniform heating when using the conventional method

of obtaining a heat source by combusting the smoke material through the use of a structure to transport and heat the smoke material while agitating it. While using a dry distillation method, it is possible to uniformly heat the smoke material, generating good quality smoke that conjures up none of the images of conventional smoked products, and that can result in a smoked product with a light and refreshing odor. Further, as the method is one of dry distillation, there will be few oxides contained in the smoke, so the coloration of the pigment of the smoked product will be stable. The result is an exceedingly superior smoke generation apparatus that can easily obtain the smoke required to easily achieve the invention in Japanese Examined Patent Application Publication H07-42696 by the present applicant.

(0034) Also, by using a structure in which there is a discharge path cleaning mechanism on said smoke discharge path to inject a spray flow such as water vapor or a water flow in the direction of said collection part, and in which the smoke is derived and generated from said smoke discharge path, the result will be an even more superior smoke generation apparatus in which the smoke discharge path is constantly cleaned, and that can always obtain good quality smoke, with no clogging of the smoke discharge path.

4. Brief explanation of the drawings

(Figure 1) This is an overall structural diagram of the present example of embodiment.

(Explanation of references)

- 1 Smoke material
- 2 Injection part
- 3 Transport duct
- 4 External air flow inhibition mechanism
- 5 Agitation and transport mechanism
- 6 Heating part
- 7 Smoke discharge path
- 8 Collection part
- 9 Discharge path cleaning mechanism
- 4A In-feed screw
- 4B In-feed screw

(Figure 1)

